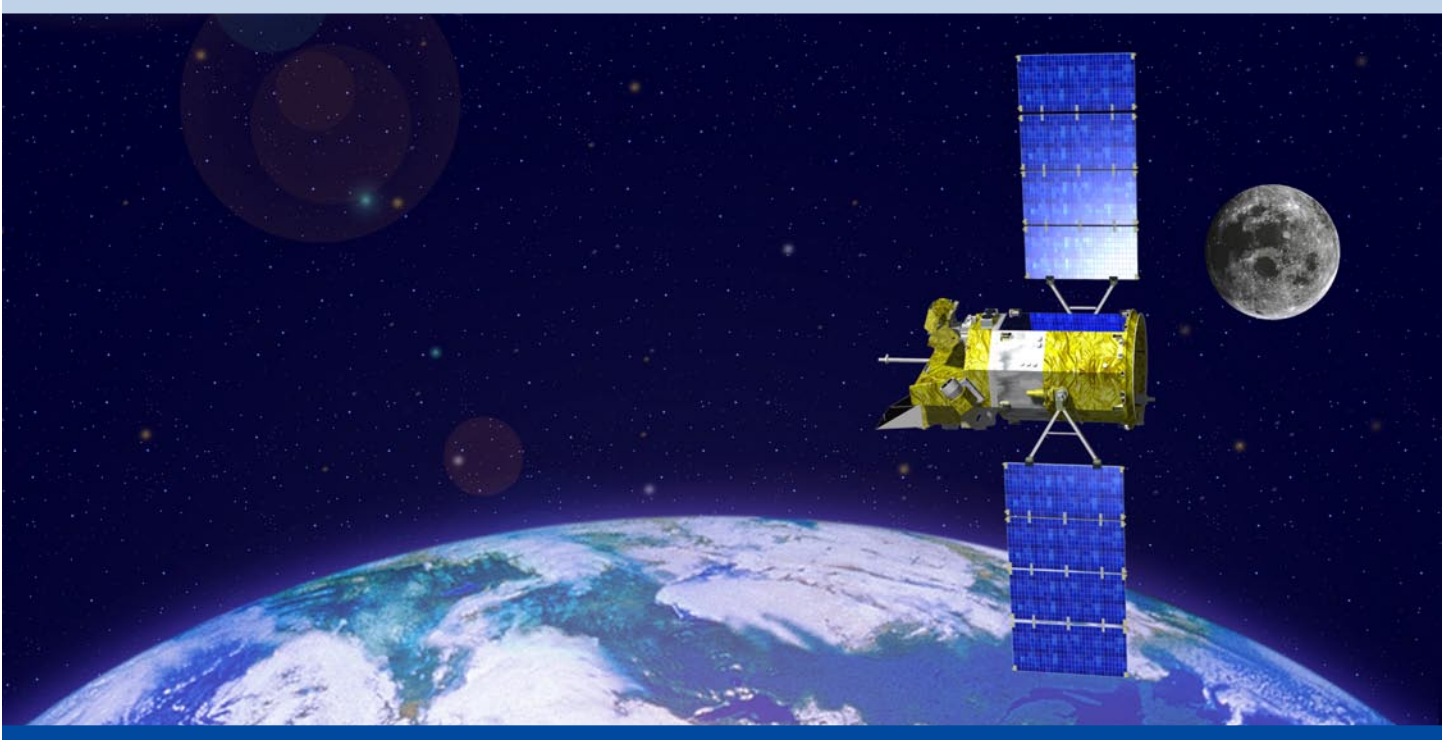


Glory

Earth Climate and Atmospheric Research Satellite



Artist's rendering of Glory in orbit

Mission Description

Glory is a low Earth orbit (LEO) scientific research satellite designed to achieve two major goals:

- To collect data on the properties and distributions of aerosols in the Earth's atmosphere; and,
- To collect data on solar irradiance for the long-term Earth climate record.

The data will enable scientists to draw conclusions about the effects of aerosols on Earth's atmosphere and climate system, and to measure the effects of solar irradiance on Earth. Glory will accomplish these objectives by utilizing two separate instruments, the Aerosol Polarimetry Sensor (APS) and the Total Irradiance Monitor (TIM).

Glory will be launched from Vandenberg Air Force Base (VAFB), California aboard an Orbital Sciences Taurus launch vehicle. After a 30-day in-orbit verification period, the spacecraft will collect scientific data on a near continuous basis for the life of the mission.

Mission operations and control will be performed at Orbital's Mission Operations Center (MOC), located at the company's Dulles, Virginia headquarters facility.

Spacecraft

The Glory spacecraft uses Orbital's LEOStar bus design, with deployable solar panels, 3-axis stabilization, and X-band/S-band RF communications capabilities. The structure consists of an octagonal aluminum space frame and a hydrazine propulsion module containing enough fuel for at least 36 months of service. The spacecraft bus also provides payload power; command, telemetry, and science data interfaces, including onboard storage of data; and an attitude control subsystem to support instrument requirements.

Specifications

Spacecraft

Launch Mass: 545kg
Redundancy: Redundant
Solar Arrays: Bi-axial articulated
Stability: 3-axis, stabilized, zero momentum
Propulsion: 45kg, monopropellant blowdown, 4-4N thrusters
Power: 750W arrays
Lifetime: 3 years (goal of 5 years)
Orbit: 824km, circular – low earth orbit (LEO)

Instruments

Aerosol Polarimetry Sensor (APS)

The APS will collect global aerosol data based on measurements of light reflected within the solar reflective spectral region of Earth's atmosphere. Since clouds can have a significant impact on the quality of these measurements, an onboard cloud camera will be used to distinguish between clear and cloud filled scenes. A three-year mission life (five-year goal) provides a minimum time period to observe seasonal and regional trends and characterize the evolution of aerosols during different climate events, such as El Niño, volcanic eruptions, etc.

Total Irradiance Monitor (TIM)

Developed and provided by the University of Colorado's Laboratory for Atmospheric and Space Physics (LASP), the TIM instrument will collect high accuracy, high precision measurements of total solar irradiance (TSI), or the amount of solar radiation in the Earth's atmosphere over a period of time. The TIM is a heritage-design instrument that was originally flown on Orbital's SORCE satellite, which was launched in January 2003.

Launch

Vehicle: Taurus or Taurus XL
Site: Vandenberg AFB, California
Date: 2008

Key Mission Partners

Laboratory for Atmospheric and Space Physics (LASP) University of Colorado, Boulder

Instrument Development
TIM Science

Orbital Sciences Corporation

Spacecraft Bus Development
Satellite Integration and Testing
Launch Vehicle Integration
Mission Operations and Control
Taurus Launch Vehicle

NASA Goddard Space Flight Center (GSFC)

Project Management
Science Data Archives

GSFC Institute for Space Studies (GISS)

Instrument Development
APS Science



Taurus Launch Vehicle

The Taurus launch vehicle provides a cost-effective and reliable launch capability for satellites weighing up to 3,500 lb. (1,590 kg). Currently in production to support U.S. government, international, and commercial customers, the versatility and flexibility of the Taurus family of vehicles provides the means to access space for a variety of payloads, and from a wide range of launch facilities and geographic locations.

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